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ABSTRACT

The Industry-Academia Partnership Pilot Project (IAPPP) was undertaken by Huertas Junior College (HJC), in Caguas, Puerto Rico, to improve advanced technical education, enhance the competitive capabilities of the region, and reduce the region's unemployment rate. The project consisted of three basic components: professional growth opportunities for faculty; curriculum development through job-specific educational experiences for all program students; and program improvement through a job orientation and work experiences or internships. In all three components, staff from participating industries acted as consultants to faculty and as mentors to students. All students enrolled in IAPPP were minority students, 84% were from rural towns, and 99% came from families with incomes below the federal poverty level. The program was implemented in three stages, the first of which was implemented in the first 3 months of the project and consisted of coordinating professors' visits to industries to establish initial contacts. The second stage, implemented in the next 4 months, was dedicated to strengthening industry ties and scheduling students' visits. The final stage, lasting 4 more months, involved student internships. The program, which achieved a 100% retention rate, increased the employment outlook of participating students by 81%. Of the 23 participating students in the electronics program, 4 students were employed by the companies they had gained experience in, and 3 of the 9 students in the Computer Drafting program were employed by companies in which they practiced. (MAB)

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INDUSTRY-ACADEMIA PARTNERSHIP PROJECT

INDUSTRY ACADEMIA PARTNERSHIP:
COMPUTERIZED DRAFTING AND ELECTRONIC PROGRAM IMPROVEMENTS THROUGH JOB EXPERIENCES, CURRICULUM DEVELOPMENT AND FACULTY PROFESSIONAL GROWTH
Quality Education for Minority (QEM) NSF

Huertas Junior College, located in Caguas in the Central Eastern part of PuertoRico was founded in 1945. It offers seven technical and eight Associate Degree programs which, together with aggressive and comprehensive services to provide maximum educational opportunities to enable our socially, economically, culturally, and/or educationally disadvantaged students achieve their professional and social goals. All credits earned are transferable to four-years postsecondary educational institutions.

GOALS AND OBJECTIVES

The goals of the Industry-Academia Partnership Pilot Project was to improve the region's advanced technological education, enhance the competitive capabilities of its industries, and reduce the region's seventeen .2 percent (17.2%) unemployment rate and thirty-eight percent (38%) youth unemployment through improving the quality of the students who graduate from the Computerized Drafting and Electronics programs by making these programs, with input from industry, more responsive to the needs of the students and industry.

Specifically, the objectives for this project were:

1. To increase student retention in program and employment opportunities by

providing two hundred eighty-eight (288) hours of job experiences (internship) to 20 disadvantaged minority students of Computerized Drafting and Electronics programs at the Huertas Junior College by placing them in related industries, which, in turn, will provide mentors to guide, teach and evaluate their work performance;

2. Through a counseling component that ran simultaneous to the job experience, improve these 20 students' and recent graduates' skills in the analysis of situations and in problem solving, among others, human relations skills applied to specific situations, decision-making, assertiveness, developing a proactive attitude, and other skills, as needed, to enable an integral education, a more competent human being and employee as well as enhance opportunities to obtain and retain future employment;
3. To improve retention in each program and improve the quality of the teaching-learning experience of the students in the Computerized Drafting and Electronics programs by including industry-specific applications in the course content and by developing related instructional materials and teaching strategies, coordinating group visits to industry, providing classroom activities in preparation to the visits and requiring oral and written reports by students of aspects learned in each visit;
4. To provide program faculty with opportunities for continuing their professional growth and networking geared to increase their disciplinary capabilities in providing a closer match with the specific requirements of related industries through opportunities for faculty and industry mentors to

interact in the workplace;

6. To continue improving communication and collaborative endeavors between industry and academia in an effort to harmonize mutual expectations.

The Industry-Academia Partnership Model is applicable to similar postsecondary institutions and industrial communities.

PROJECT DESCRIPTION

The project consisted of three basic components, namely, professional growth opportunities for faculty, curriculum development through job-specific educational experiences for all program students, including development of pertinent educational materials, and program improvement through job experiences or internships plus complementary orientation for students. In all three components, staff from each participating industry acted as consultants to faculty and as mentors to students. All students enrolled at Huertas Junior College are minority students (Hispanic, almost all Puerto Rican). Eighty-four percent (84%) were from rural towns and reside in rural areas. While most of the students in these two programs are male (eighty-seven percent (87%), more females are becoming interested in the Computerized Drafting program. Ninety-nine percent (99%) of enrolled students came from families with incomes below the federal poverty level and receive financial aid. The average age of this year's student body is 23 years of age. Student enrollment in these two programs comprised thirteen percent (13%) of all students enrolled in the current period.

Characteristics of students enrolled in two-year colleges that apply to our circumstances in Puerto Rico include their marked orientation toward employment, unrealistic goals (both academic and occupational), average or below average academically, lack basic thinking and communication/math skills, are dogmatic, cannot wait too long for rewards or to see results, are closely influenced by parents, are first-generation college students and live at home (Nuñez, 1990). A profile of high risk students in Puerto Rico denote an easily discouraged young person, from low income areas, have unrealistic goals, lack vocational goals, have low self-esteem, poor social adjustment, poor basic thinking skills, and are culturally deprived.

Underprivileged, high risk minorities who seek technical careers are particularly concerned with connecting learning to real life, specifically, employment. In order to motivate students to complete their studies and improve their opportunities for employment after graduation, Huertas Junior College and a group of industries of the area have joined in this partnership with the purpose to armonize program curriculum with industry requirements.

Yet, the work force of the future will have to be "very well trained and prepared" (López, 1990) for companies to successfully compete in an ever increasing international and competitive economic world. Students of Electronics and Computerized Drafting in our College have only the duration of their respective academic program, one calendar year, to become well trained in their respective field, improve their communication/people skills, expand their world view and attune their attitudes to what is expected of them in

the work place. During the planning phased of this proposal, in fact, industry representatives were emphatic that attitudinal change must be part of the project, particularly "Total Quality" concepts, already adopted by area industries. Industry spend "considerable" effort, time and expenses in training new employees, both technically -- tailoring technical knowledge to their needs -- and in terms of attitudes, team work, problem solving skills, coalesced in "Total Quality" concepts.

"Partnership has become the watchword of the nineties". Among the measures contained in Puerto Rico's government economic development plan announced last February was an increase in cooperation among the private sector, educators and government.

The Industry-Academia Partnership Project is a reflection of our times and needs. It is consonant with National Goal for Education #5: "By the year 2,000, every adult American will be literate and will possess the skills necessary to compete in a global economy and exercise the rights and responsibilities of citizenship" and addresses those Goal's objectives that call for major American business to be involved in strengthening the connection between education and work; for a substantial increase in the proportion of qualified students, specially minorities, who enter and complete their college program; and for a substantial increase in college students' thinking, problem-solving and communication skills. Some of the outcomes of partnerships as strategy are: increased student and professor access to technology, increased admission and retention, decreased remediation at academia, decreased training costs for entry-level employees,

improved public relations, increased productivity at industry and finally improved economic development and quality of life for the community.

IMPLEMENTATION OF THE PROGRAM

The main objective of this project was to improve advanced technological education in electronics and computer drafting while meeting the requirements and needs of the high tech industrial sector.

To achieve these goals and facilitate implementation, the project was divided into three phases in accordance with our academic schedule. The Project Coordinator contacted the Human Resources Director of each industry and scheduled meetings during which she presented the project following a structured agenda. The high-tech industries in the region that were visited were: **Searle, Janssen Pharmaceutical, Intel, Chesebrough Ponds, McNeil Consumer Products, Johnson & Johnson Consumer Products, Johnson & Johnson Professional, Ethicon, Colgate-Mennem, Smithkline Beecham, Novatek and Amgen Manufacturing.** The first phase, from September to December, consisted mainly of coordination of professors' visits to industries to establish initial contacts and schedule meetings with mentors and engineers. Literature about the project and the Institution was provided to the industries. This first meeting usually led to others with the engineers or mentors and the professors of each area. The professors completed fifty-two (52) hours of direct contact with engineers, supervisors and other specialists during which they learned new approaches, techniques and procedures in

each field and how to integrate these to their curricula.

The second phase, from January to April, was dedicated to strengthening ties with the Industries and to scheduling students' visits. These visits were programmed with industry supervisors who were mentors during the students' internships. Twelve industries were visited by students in the Electronics Program for a total of one-hundred eight (108) direct contacts. In Auto CAD, students have visited six industries totaling fifty-three (53) contacts.

The third phase, from May to August, consisted of the student internship. More industries and companies use internships as a way to hire their personnel. According to the Management Review (June 1995), significant increase in internships for 1995, is reported representing a stronger business commitment for next generation labor markets. Listings in the Internship Directory have climbed from 22,000 in 1992 to 43,000 in 1994. The quality of internships are also improving. Internships are now seen by the majority of College students as an essential pre-requisite for any job search. Following these trends we placed thirty-one (31) students in eleven (11) industries. The students participated in a two-hundred twenty eight (288) paid hours internship that began in May, during the third trimester. Twenty-seven employees participated as mentors facilitating the experience of work and practice in their related field. Criteria for student selection were: domain of **intelectual skills** evidenced through: good academic achievement, disposition to seek new learning alternatives and problem solving precisely and quickly; the second criteria was **mastery of different technical skills inherent of AutoCAD and**

Electronics Programs; the third major criteria was the **evidence of good human skills such as: motivation, assertive communication, respect, ability to work in group, and finally the development of occupational skills such as: punctuality, attendance, personal appearance, responsability, acceptance of recommendations leadership/works with little supervision, and the ability to follow directions.**

We can attribute the level of success evidenced through our past evaluations to the commitment and quality of mentors within the industry. The following is a testimony of a mentor from the multi-national company INTEL: (see enclosure)

> "The student Luis Morales of Huertas Junior College has worked at test maintenance in P.A.M.P. plant for the passed three month. He has repaired test equipment, given support at the schomoo reliability testing area, has done A.T.E. testing with the H.P. 3070 series II, has done functional testing at F.A.T., and has calibration test equipment. Luis has demonstrated responsibility, initiative, and timeliness during this period. Luis has received and executed tasked assigned in a positive and efficient manner. Luis has a good attitude and can work with very little supervision. Luis would most definitely be a good asset to add to any organization and has my recommendation."

A career guidance subcomponent that ran simultaneously improved the students skills in the analysis of situations, problem solving, human relations skills, developing proactive attitudes through individual and group guidance and counseling by staff from the Counseling Office, to enable an integral education, develop a more

competent human being and employee as well as to enhance opportunities to obtain and retain future employment. They participated in conferences concerning Total Quality Concepts, Safety Practices in Manufacturing, Time Management, Team Working and Ergonomics that would prepare them for a successful experience, among other topics suggested by the Human Resource Department.

OUTCOMES
EMPLOYMENT OUTLOOK

The effectiveness of the project is evidenced in the 81% increase of the employment outlook of all participating students. Four of the 23 students in the Electronics Program were already employed by different companies. This experience represented more opportunities for promotions within the company for which they worked. For 18 participants in the electronic program, this experience was a first job experience. Seventeen students from the Electronic Program were interviewed for employment in a high-tech electronic industry, and they were prequalified for the next stage in the evaluation process. Of the 18 students, 3 were employed by the industries in which they practiced. Of nine participants from the Computerized Drafting program, three were employed by companies in which they practiced. Most of the students in the Computer Drafting Program are being evaluated for possible job openings in the different companies.

RETENTION

The major achievements of the project were 100% retention rate of participants. Concerning curriculum, both academic programs experimented

significant changes making them responsive to the job markets by changing education to work content. A few of the innovations in the teaching process include: scheduled visits to industries for first hand experience, research projects as evaluation criteria, teaching strategies which allow students to discuss their experiences and answer their questions. During this second year, we have expanded the project to include the Electricity, Automechanics and Refrigeration & Air Conditioning Programs through institutional funds. These findings allow us to conclude that this experience encourages retention, employment, and a close relationship between theory and practice and between industry and academy

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